

IN THE CLAIMS:

All of claims 1-11 are set forth below, none of which are amended herein. The status of each claim is indicated as (original).

1. (original) A heater lamp control apparatus to apply an AC voltage inputted through a power input unit to a heater lamp via a power supply unit, comprising:
an AC voltage phase detection unit to detect a phase of the inputted AC voltage when a magnitude of the inputted AC voltage is over a predetermined level;
a pulse signal generation unit to generate a heater lamp control pulse signal based on a result of the detection; and
a control unit to control a drive- timing of the heater lamp based on the generated heater lamp control pulse signal.

2. (original) The heater lamp control apparatus as claimed in claim 1, wherein the pulse signal generation unit generates a pulse reference signal based on a result of the detection, a phase-delayed pulse delay signal based on the pulse reference signal, and the heater lamp control pulse signal based on a result of a comparison of magnitudes of the pulse reference signal and the pulse delay signal.

3. (original) The heater lamp control apparatus as claimed in claim 2, wherein the pulse signal generation unit comprises:

a comparator to compare magnitudes of signals inputted to a positive terminal and a negative terminal thereof; and

a capacitor connected to the negative terminal of the comparator, to delay a phase of the pulse reference signal and to convert the phase-delayed pulse reference signal into the pulse delay signal, and if the pulse reference signal is generated and outputted to the positive and negative terminals respectively, the comparator outputs the heater lamp control pulse signal to the control unit based on a result of the magnitude comparison of the pulse reference signal inputted to the positive terminal and the pulse delay signal inputted to the negative terminal.

4. (original) The heater lamp control apparatus as claimed in claim 1, wherein the AC voltage phase detection unit comprises:

a zener diode having one terminal connected to an AC terminal of the power input unit, to turn on when a voltage over a predetermined level is inputted; and

a light-emitting element having one terminal connected to the other terminal of the zener diode, to emit light based on an input current occurring when the zener diode turns on, and if the magnitude of the AC voltage is over the predetermined level, the phase detection is performed

based on the light-emitting of the light-emitting element due to the input current occurring when the zener diode turns on.

5. (original) The heater lamp control apparatus as claimed in claim 4, wherein the pulse signal generation unit further comprises:

a light-receiving element to turn on based on the light-emitting of the light-emitting element and to generate the pulse reference signal.

6. (original) The heater lamp control apparatus as claimed in claim 1, wherein the control unit controls a fixing unit circuit to be switched on and off according to pulses in the heater lamp control pulse signal so that a voltage supplied from the power supply unit is applied to the heater lamp.

7. (original) A heater lamp control method of applying an AC voltage inputted through a power input unit to a heater lamp via a power supply unit, comprising:

detecting a phase of the inputted AC voltage when a magnitude of the inputted AC voltage is over a predetermined level;

generating a heater lamp control pulse signal based on a result of the detection; and

controlling a drive-timing of the heater lamp based on the generated heater lamp control pulse signal.

8. (original) The heater lamp control method as claimed in claim 7, wherein the generating the heater lamp control pulse signal comprises:

generating a pulse reference signal based on a result of the detection;

converting the generated pulse reference signal into a phase-delayed pulse delay signal based on the pulse reference signal; and

generating a heater lamp control pulse signal based on a result of a comparison of magnitudes of the pulse reference signal and the pulse delay signal.

9. (original) The heater lamp control method as claimed in claim 8, wherein the converting the generated pulse reference signal into a phase-delayed pulse delay signal comprises:

outputting the generated pulse reference signal to positive and negative terminals of a comparator; and

delaying a phase of the pulse reference signal by a capacitor connected to the negative terminal and converting the phase-delayed pulse reference signal into a pulse delay signal, and

the generating the heater lamp control pulse signal comprises:

comparing magnitudes of the pulse reference signal inputted to the positive terminal and the pulse delay signal converted at the negative terminal, and generating the heater lamp control pulse signal based on a result of the comparison.

10. (original) The heater lamp control method as claimed in claim 8, wherein the detecting the phase of the inputted AC voltage comprises:

turning on a zener diode to allow current to flow when a voltage over a predetermined level is inputted; and

emitting light from a light-emitting element based on an input current occurring when the zener diode turns on, and the phase detection is performed based on the light-emitting of the light-emitting element due to the input current occurring when the zener diode turns on.

11. (original) The heater lamp control method as claimed in claim 10, wherein the generating the pulse reference signal further comprises:

generating the pulse reference signal when a light-receiving element turns on based on the light-emitting of the light-emitting element.